

REMARKS

This application has been amended in a manner believed to place it in condition for allowance at the time of the next Official Action.

Claims 1-20 are amended. Support for the amended claims may be found generally throughout the specification, for example, in Example 1.

The specification has been amended to include a description of the symbols shown in Figures 1B, 2A, 2B, 5 and 6. This amendment does not introduce new matter into the specification, as evidenced by applicant's article from which the originally-filed drawings are based.

The Official Action rejects claims 1-20 under 35 USC §102(b) as being anticipated by FLODIN US 6,210,441 ("FLODIN"). Applicant respectfully disagrees.

FLODIN is offered for teaching a linear polyurethane comprising polyisocyanates, polyester diol, diamine chain extenders, and chain terminating ethanolamine. FLODIN is also offered for teaching an NCO/OH ratio, or the diisocyanate to polyester diol ratio, is greater than 2. The Official Action concludes that FLODIN inherently teaches the claimed mechanical properties, as FLODIN discloses the same monomers and stoichiometric ranges as recited.

However, the structure of the polymer is not solely determined by the stoichiometric ratio of the reactants. The

structure of the polymer is also determined by the process by which the reactants are allowed to react with one another.

The claimed linear block polymer has alternating "hard" and "soft" blocks/segments, and the blocks/segments are short. This leads to a low elongation at break, and it also affects the degradation rate. The recited y and z values are measures of the length of the blocks and repeating units of the polymer, respectively. The recited NCO/OH ratio and the NCO/amine ratio determine the average structure of the pre-polymer and the polymer, respectively.

While FLODIN may suggest that  $\text{NCO/OH}=2$  gives the shortest possible pre-polymer (column 4, line 35), different pre-polymers can be obtained depending on the method of polymerization. For example, if all reactants are mixed together, one obtains a wide distribution of chain lengths with a higher number of long pre-polymer molecules and a higher number of diisocyanate molecules that have not taken part in the reaction. However, if the diol is added very slowly to the other reactants, one obtains a more narrow chain length distribution with a lower number of long molecules and a lower number of "un-reacted" diisocyanate molecules. However, the average of the NCO/OH ratio may, nevertheless, be 2 in both cases.

The NCO/amine ratio also may represent two different cases. Long pre-polymer molecules form long soft blocks in the product polymer and short pre-polymer molecules form short soft

blocks in the product polymer. When the amine is added to the pre-polymer in the next step, long hard blocks will be formed in the product polymer if large amounts of unreacted diisocyanate molecules are present, and short hard blocks will be formed if small amounts of unreacted diisocyanate molecules are present. The NCO/amine ratio can, however, be the same in both cases.

In the present invention, it is of interest to form short segments, i.e., the  $y$  value is small. Therefore, it is desirable for the present invention to have a narrow chain length distribution of the pre-polymer, or between 0 and 4 as claimed.

The length of both the hard and the soft blocks has been shortened in the claimed invention, not by choosing other reactants, but by modifying the process of forming the pre-polymer. Compared to FLODIN, the diol is added even more slowly and the pre-polymerization is carried out at lower temperature: 50-60°C. By doing so, the reaction of the claimed invention can be controlled to yield a more narrow chain length distribution of the pre-polymer, and the pre-polymer results in a product with a  $y$  value of  $0 < y < 4$  that differs from FLODIN.

Thus, in view of the above, as FLODIN fails to disclose or suggest a method consisting essentially of adding esterdiol at a sufficiently slow rate to the aromatic diisocyanate at a temperature of 50-60°C, FLODIN cannot inherently teach the claimed  $y$  and  $z$  values for independent claim 1, as well as the recited mechanical properties in the dependent claims.

Therefore, as FLODIN does not anticipate the claims, applicant respectfully requests that the rejection be withdrawn.

In view of the foregoing remarks, applicant believes that the present application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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